3 Sheets—Sheet 1

A. H. WAGNER.
Grinding-Mill.

No. 211,948. **Patented Feb. 4, 1879.**

Fig 2.

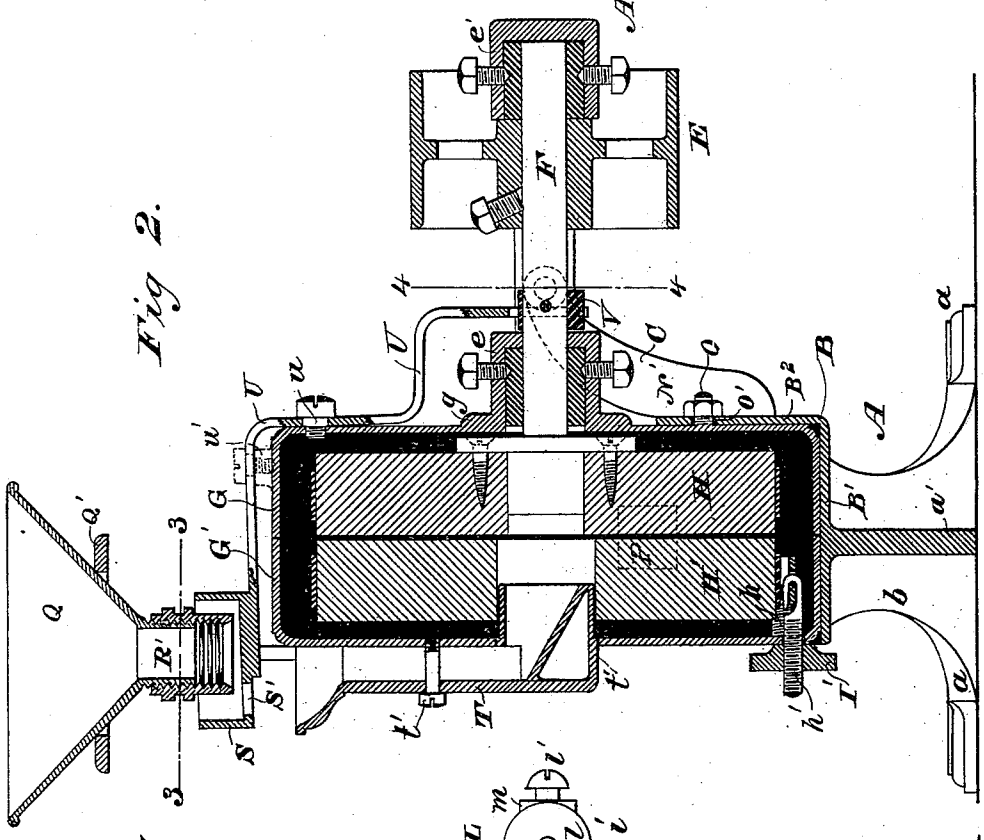
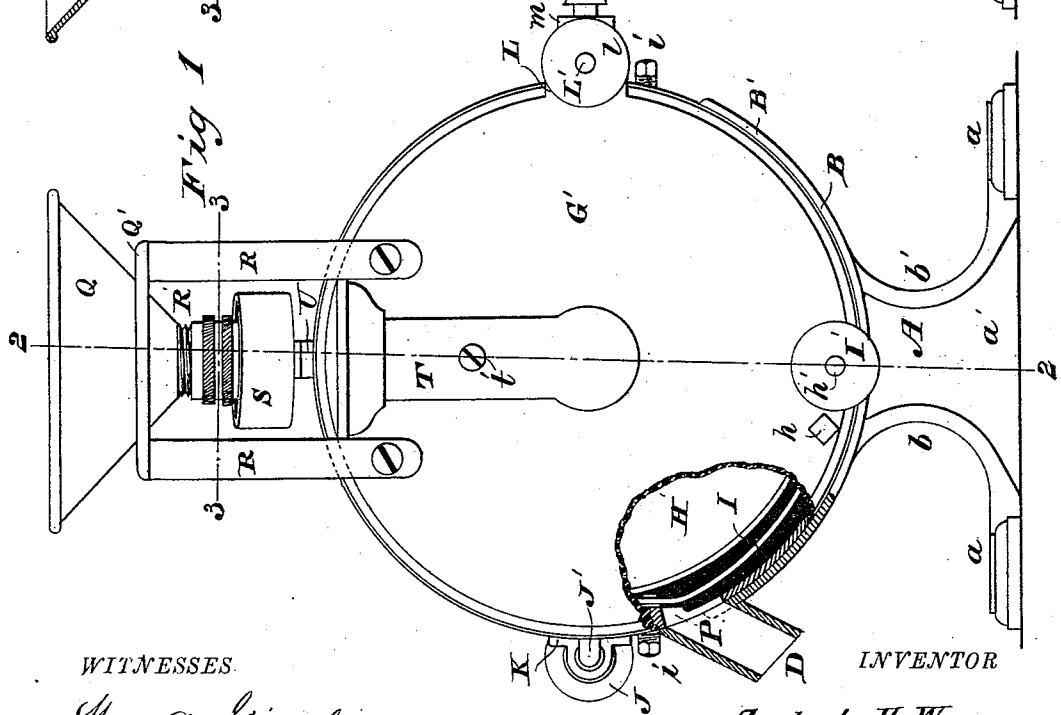


Fig 1



WITNESSES

Wm A Skinkle
Geo W Breck.

By his Attorneys
Baldwin, Hopkins & Peyton.

INVENTOR
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3 Sheets—Sheet 2.

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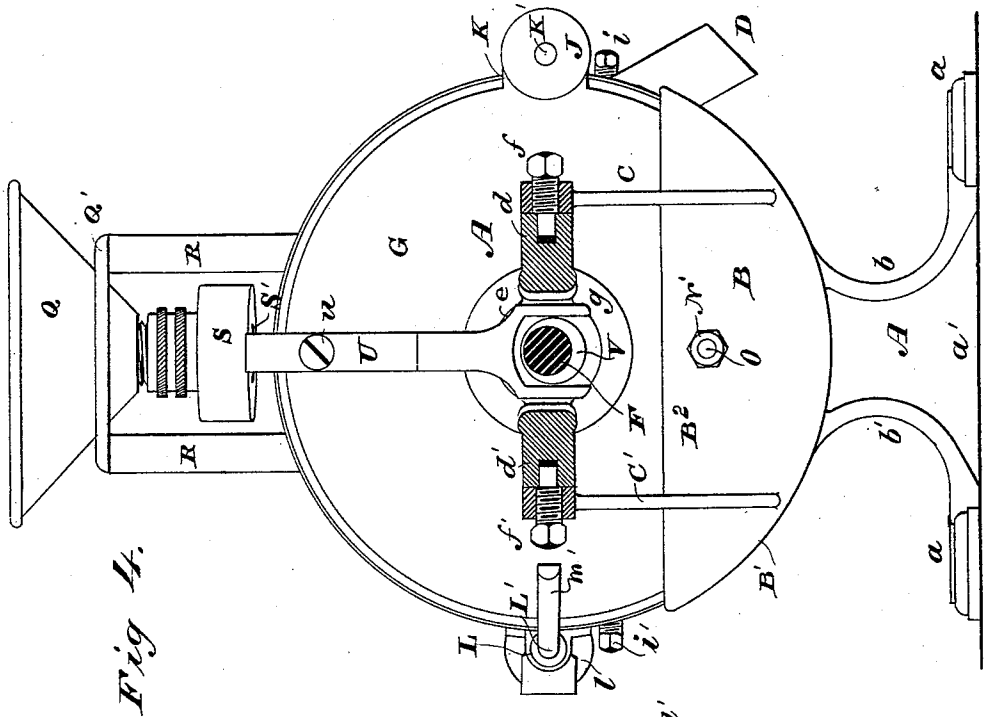


Fig 4.

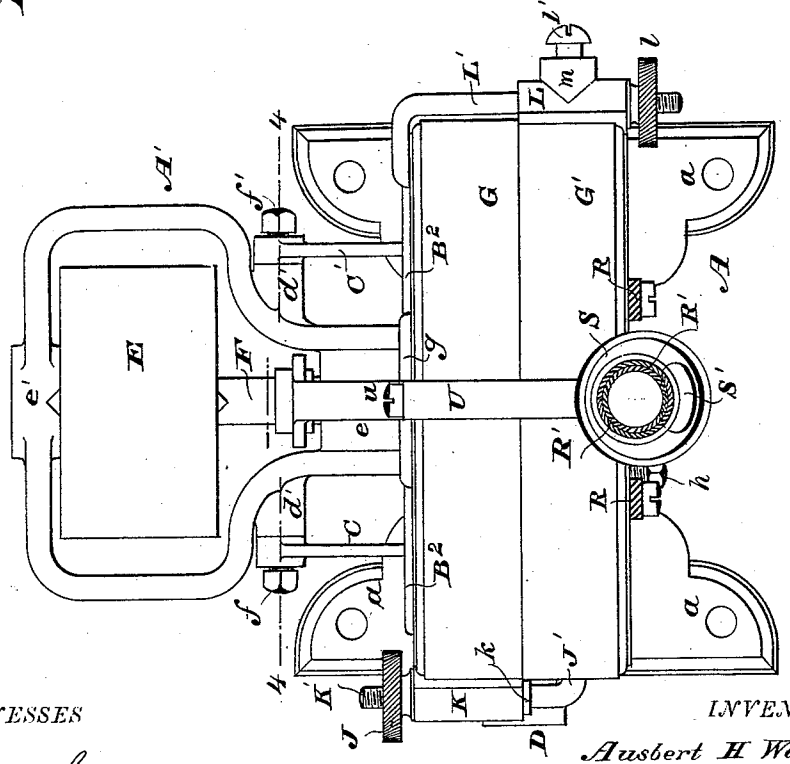


Fig 3.

WITNESSES

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3 Sheets—Sheet 3.

A. H. WAGNER.
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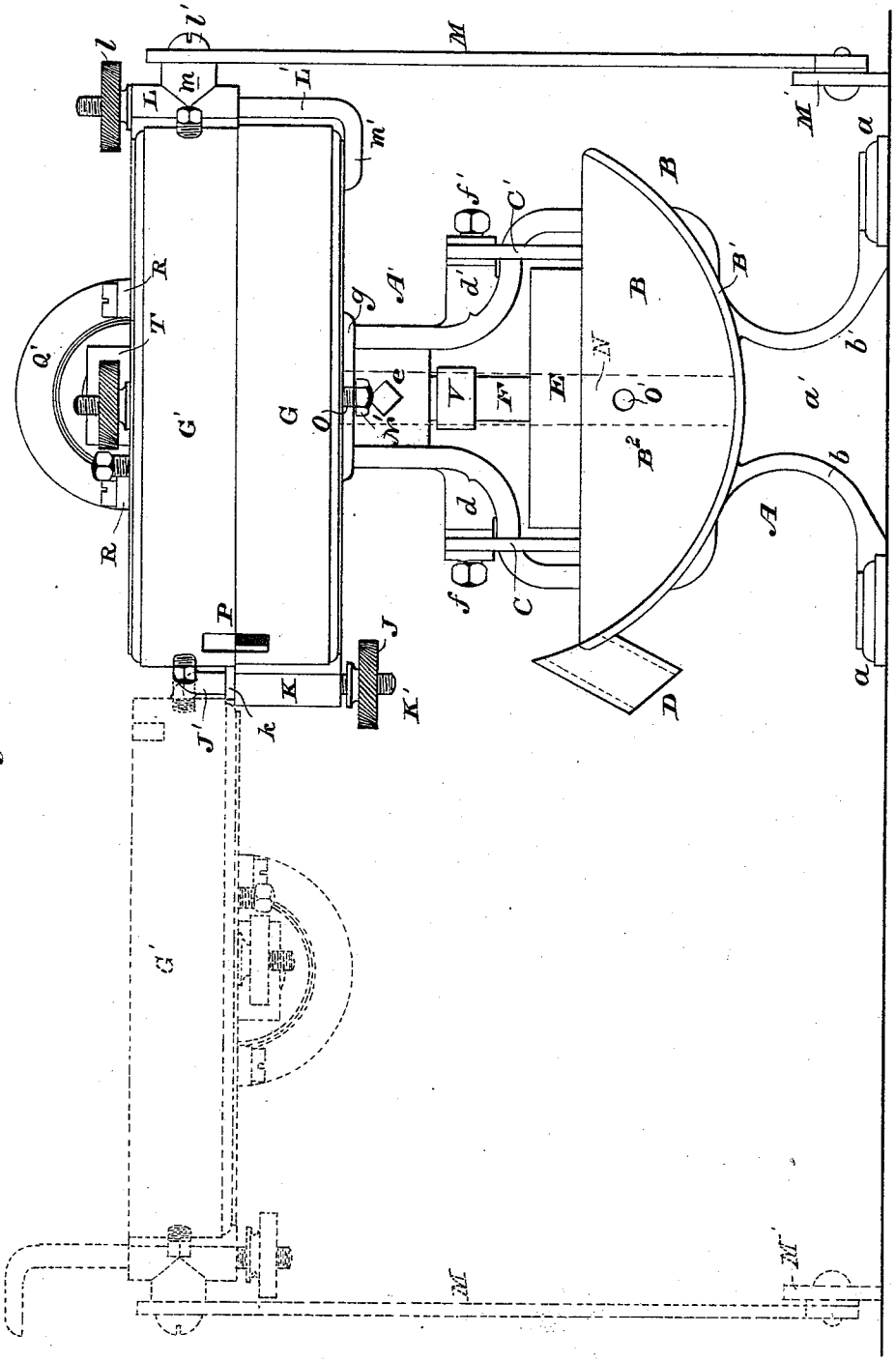


Fig 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

AUSBERT H. WAGNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO ANNA G. WAGNER, OF SAME PLACE.

IMPROVEMENT IN GRINDING-MILLS.

Specification forming part of Letters Patent No. **211,948**, dated February 4, 1879; application filed December 16, 1878.

To all whom it may concern:

Be it known that I, AUSBERT H. WAGNER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification:

My invention relates to improvements in mills of the class known as "vertical mills," or those in which the runners revolve about horizontal axes, and particularly to that type of such class in which casings for the stones are made in sections hinged together.

My objects, mainly, are so to construct a vertical mill as to adapt it for use in connection with certain of the improvements shown, described, and claimed in Letters Patent of the United States for grinding-mills granted my assignee January 7, 1879, No. 211,281.

My said prior patented invention relates, chiefly, to improvements in horizontal mills. Some of said improvements, however, may without change readily be applied to and used in connection with vertical mills, as shown in my present invention. To adapt the vertical mill, as in my present improvements, for operation in connection with other of my said prior patented improvements required reorganization of parts producing certain novel combinations, and necessitating certain changes in construction, constituting, for the main part, the subject-matter hereinafter specifically claimed.

My invention further relates to certain improvements in the feeding and delivering devices, as will hereinafter clearly be designated.

In the accompanying drawings I have shown all my improvements as embodied in a portable mill. Some of my improvements may, however, obviously be used without the others, or in connection with a mill differing in some respects from that therein shown, and hereinafter particularly described.

Figure 1 is a front elevation of the mill in working position, with portions of the stationary-stone casing and frame broken away; Fig. 2, a vertical central section, as indicated by the line 2 2 of Fig. 1; Fig. 3, a plan or top view, partly in horizontal section, on the lines 3 3 of Figs. 1 and 2; Fig. 4, a rear elevation, partly in vertical section, on the lines 4 4 of Figs. 2 and 3. Fig. 5 is a front elevation, showing the casing as thrown up to bring it and the stones in proper position to enable the movable section to be swung around as represented in dotted lines.

A sectional support, main frame, or husk for the stones is made in two parts, the one section, A, constituting the base or frame proper, and the other section, A′, being hinged to the main section or frame-base, constituting an adjustable supplementary or pulley frame. This pulley-frame or adjustable section A′ is hinged to the main section or base A, so as to be capable of rocking vertically about its hinged connection therewith, in the manner and for the purpose hereinafter to be explained.

The stationary or base section A is provided with broad feet or bottom flanges *a*, with screw-holes to adapt it to be firmly fastened in place upon the floor or supporting-beams. The central or upright portion of the main frame or fixed section is formed by the curved upright side pieces or standards *b b′* and the vertical brace, web, or cross-piece *a′*. The side pieces broaden out at bottom to form the base flanges or feet *a a*, and at top terminate in a casing seat or socket, B, open in front and at top and closed at the back. This socket rest or seat is formed by the curved plate or segment B^1, constituting its bottom and ends, and the back plate, B^2, terminating at top flush with the top or ends of the piece B^1, which is in the form of a regular arc or segment of a circle, concentric with the circular casing for the stones. Curved lugs or arms C C′ are provided at the back part of plate B^2 of the base-section of the frame. These arms project upwardly and rearwardly from the back of the base-section A of the frame, and the supplementary section or pulley-frame A′ is pivoted to them on a level with, or in the horizontal plane of, the center of the stones and their casing, presently to be described.

The base-section A is by preference made of cast metal and in a single piece, the parts *a*, *a′*, *b*, *b′*, B^1, B^2, C, and C′ being cast together. A spout, D, to which the meal is delivered as ground, is provided at one end of the base-

plates B^1 of the open-front frame-socket, and is, by preference, cast with the rest of the main section of the frame.

The supplementary pulley-frame or hinged section A′ is of skeleton form to receive the band-pulley E, and is provided with bearings *e e′* at its opposite ends. The driving-spindle F revolves in suitable bushings in these bearings. In its normal or working position the pulley-frame is supported in a horizontal position at the back of the base-section of the frame to which it is hinged by trunnions *d d′*, supported on pivot-bolts *f f′* in the outer ends of the arms C C′. The pulley-frame is preferably of cast metal and formed by a single casting.

The divided casing for the stones is formed in two sections, G G′, connected with each other as in my before-mentioned invention, patented January 7, 1879. The casing is adjustable with the pulley-frame or supplementary section A′ of the main frame, the fixed section G of the casing being firmly attached to the inner end of the pulley-frame or hinged section of the supporting-frame. The casing-section may either be securely fastened by a flange and bolts to the pulley-frame or be cast with it, the latter construction being shown by the drawings, where the flange *g*, at the end of the bearing *e* of the pulley-frame, unites with the back of the casing-section.

The driving-spindle F passes into the casing through the back of its section G, and is suitably connected with the running stone, H, revolving in this fixed section of the adjustably-supported casing.

The stationary stone, H′, is adjustably hung in its section G′ of the casing in precisely the same manner as the corresponding stone is mounted in my previous invention, shown in the patent above referred to—that is to say, the stone is provided with balancing trunnions supported in an adjusting-frame, I, fulcrumed upon the pivots *i i′*, passing through the casing-section; and the stop-screw *h* and the hook-ended adjusting-rod or screw-bolt *h′* and its clamping-nut I′ perform the same duties in this as in my said prior invention.

To render intelligible the operation of my present invention, a brief description will be given of the connections between the two sections of the casing, which are embodied in the improvements covered in my said prior patented invention, and which connections, *per se*, are not herein claimed. A sleeve-bearing or tubular bracket, K, is provided at the side of the fixed casing-section G—that section which is fixed to the pulley-frame or hinged section A′ of the supporting-frame. A turning-bolt or swivel-rod, K′, threaded at one end, fits loosely in this bearing, and has a clamp-wheel, J, and a shoulder or collar, *k*, at opposite ends of the bearing. The cranked or bent end of the swivel-bolt forms the pivot J′, upon which the adjustable section G′ of the casing turns vertically. Opposite to this combined horizontal and vertical hinge and clamp connection between the sections is the clamping-connection at the sides of the two sections of the casing, said clamping-connection consisting of the sleeve-bearing L on the hinged section G′ of the casing, with the turning rod or swiveling bolt L′, threaded at one end and bent or hooked at the other, and the milled nut or clamp-wheel *l*. The lug or trunnion *m* projects from the bearing L for the pivot *l′* of the traversing support or truck-frame M, having the rollers M′ at its lower end.

From the above description it will be seen that when it is desired to open the casing for inspection or for dressing the stones, the adjustable pulley-frame or hinged section A′ of the supporting-frame is first tipped or rocked vertically on its hinged connection with the base or main section A of the frame, thus bringing the entire casing into the position shown in Fig. 5, with the stones horizontal and the driving-spindle vertical. When so adjusted a prop, N, (shown by dotted lines,) may be placed with its lower end upon the curved piece or bottom plate, B^1, of the casing-socket of the frame, to prevent the accidental tipping of the casing back to its seat in the frame. The clamping-connections being next loosened, as fully explained in my prior invention, referred to herein, the adjustable or hinged section of the casing, which is now at top, may be swung around horizontally on the opposite or lower section, and then turned over while balanced on the traversing support and its doubly-hinged connection with the opposite section. The dotted lines, Fig. 5, show the casing-section G′ swung around and turned over to bring the face of the stone up. When the two sections are again brought together and clamped, as shown in full lines, Fig. 5, the pulley-frame or hinged section A′ of the supporting-frame is lowered by rocking on its pivotal supports *d f d′ f′*, and brought to its rest or socket B in the base or stationary section of the frame. The top and front of the base being open allows the casing to enter and adjust itself in its support or rest. To prevent jarring or accidental movement of the casing I prefer to attach a short threaded stud, O, to the back of the casing-section G, which stud enters an elongated slot, O′, in the back B^2 of the base-section of the supporting-frame, and is firmly clamped by a thumb-nut or jam-nut, N′, when the mill is in running position. By loosening and removing the nut, the screw-stud is left at liberty to pass out of the slot when the casing is turned up.

An opening, P, in the side of the casing, formed partly in each section thereof, registers with the delivery spout or trough D on the frame-base. In this way I avoid the attachment of a spout to the casing.

The grain or other substance to be ground is supplied to the stones from a hopper, Q, loosely resting on a ring, Q′, secured to and supported on standards R R, detachably secured at their lower ends to the face or front of the hinged section G′ of the divided casing

by screws. The hopper is provided with an extensible feed-tube, similar, except that it is shorter, to that shown in my before-referred-to patented invention.

The short fixed threaded section of the feed-tube has the adjustable tube R′ secured to it by the internal screw-thread. One or more milled beads or collars are formed on the tube R′ to turn it by, in lengthening or shortening it. A combined shaking shoe or feed-cup and regulating-valve, S, beneath the hopper is provided with an opening, S′, in its bottom, through which the substance to be ground passes to the conducting-tube T, which conveys the grain, &c., to the stones. The shank or shaking bar U of the feed-cup is doubly bent, as clearly shown by Fig. 2, and is pivoted at *u* to the rear side of the fixed or back section, G, of the case. The lower or forked end of the shaking bar is engaged by an eccentric, V, on the driving-spindle F, as usual. By adjusting the feed-tube R′ so as to bring its lower end nearer to or farther from the bottom of the shoe or feed cup-and valve, the supply to the stones may be decreased or increased, as desired, while the shaking of the shoe prevents clogging of the grain, &c., either between the bottom of the tube and cup or at the discharge-slot S′. To admit of a nicer adjustment and more diminished supply than can well be attained when the shaker-shank is fulcrumed on a horizontal support, and thus caused to rock slightly vertically, I provide a threaded opening or tap, *u′*, in the edge or periphery of the casing-section G, (see Fig. 2,) so that the fulcrum or pivot *u* may be changed, as shown in dotted lines. When so fulcrumed the shaker-shoe may be given a simple horizontal reciprocating movement about its vertical fulcrum. The slight vertical movement of the shoe when vibrated about a horizontal fulcrum would, were the feed-tube screwed down as far as it may be when the vertical fulcrum is used, cause the valve-surface or bottom of the shoe to strike the tube, or come so near doing so as to interrupt the feed when at either end of its movement. The forked end of the shaker-bar must have a little play on or fit sufficiently loosely upon the eccentric not to bind when the fulcrum is changed, as described.

The stone-supplying tube T has a short bend or elbow, *t*, at its lower end to enter the central opening in the casing-section G′, to conduct the grain to the eye of the stone. The main portion or upright part of the tube is of a half-tube or trough form—that is to say, it is open at its inner side, which rests against the face of the casing and is thus closed. The flaring mouth or upper end of the tube is beneath the slot S′ in the feed-cup. The half-tube is secured to the casing by a screw, *t′*, or in other suitable way to admit of its removal.

When the casing is to be opened the hopper is removed, and either the shaking bar and its shoe and feed-cup or the hopper-support is also detached, so that the hinged section of the casing may be left free to swing about its connection with the opposite section. The casing and the stones having been brought to the proper position by rocking the pulley-frame or supplementary and rearwardly-projecting section A′ of the main frame upon the fixed or base section A, the subsequent adjustments and operations are precisely as in my before-mentioned improvements patented January 7, 1879.

The main feature of my present invention, it will be seen, is the sectional supporting-frame, the one part hinged to and projecting laterally from the other and carrying the casing, and having the capacity of tipping or rocking vertically to adjust the casing (both sections thereof together) from its normal or vertical position to a horizontal position preparatory to opening.

The bent end or hook *m′* of the clamping turning-rod L′ may be caused to interlock with the casing-section G by means of a notch or recess in said section, into which notch the hook is partially drawn when the two sections of the casing are clamped together. In this way any slip or turning of one section on the other in raising or lowering the casing would effectually be prevented.

When resting on the socket or seat of the base portion of the frame both sections of the casing rest on their edges or peripheries, and their weight, together with that of the stones, holds them in proper relative position.

I claim as of my own invention—

1. The combination, substantially as hereinbefore set forth, of the supporting-frame base or main section, the pulley-frame or hinged section of the supporting-frame rocking vertically about a fixed center on its pivotal supports at the back of the main section and above the level thereof, and the two-part casing for the stones partaking of the movements of the pulley-frame, and one section of which is rigidly attached to said pulley-frame to adjust the casing-sections and stones from a vertical to a horizontal position, and vice versa, simply by tipping the pulley-frame, as described.

2. The supporting-frame base or main section having the stone-casing seat or socket open at front and top and closed at the back, substantially as and for the purpose described.

3. The combination of the base or main section of the supporting-frame, the supplementary or hinged section thereof, the fixed section of the stone-casing secured to said supplementary section of the frame, and the hinged section of the stone-casing having the capacity of both horizontal and vertical adjustment, these members being and operating substantially as hereinbefore set forth.

4. The combination, substantially as hereinbefore set forth, of the supporting-frame main section or base A, open at front and top, the rearwardly and upwardly projecting arms thereof, and the pulley-frame or adjustable section A′ of the supporting-frame pivoted to said

arms above the level of the main section of the frame, and carrying the two-part hinged casing for the stones, for the purpose described.

5. The combination of the hopper, its extensible feed-tube, and the combined shaking feed-cup and valve, these members being and operating substantially as hereinbefore set forth.

6. The combination of the driving-spindle, its eccentric, the shaker-bar pivoted on the stone-casing, the combined valve and feed-cup, the hopper, its extensible feed-tube, and the supply-tube leading to the stone, substantially as and for the purpose hereinbefore set forth.

7. The combination of the supporting-frame base or main section provided with the seat or socket for the stone-casings and the delivery-spout attached to the said base, and registering with the peripheral openings in the stone-casing, as and for the purpose described.

In testimony whereof I have hereunto subscribed my name.

A. H. WAGNER.

Witnesses:
GEORGE BERNHARDT,
WEBBER G. KENDALL.